Kentucky Teacher Education Journal: The Journal of the Teacher Education Division of the Kentucky Council for Exceptional Children

Volume 3 | Issue 1 Article 1

5-21-2016

Examining the Influence of Self-Determination Theory Components with Students of Varying Cognitive Abilities

Antonia Szymanski

Western Kentucky University, antonia.szymanski@wku.edu

Examining the Influence of Self-Determination Theory Components with Students of Varying Cognitive Abilities

Abstract
This study sought to explore difference in the influences of components of Self-Determination Theory between students of average and high academic ability. Differences were examined using correlational comparisons, t-tests, and analysis of variance (ANOVA). As expected, students with high academic ability reported high perceptions of competence. Although other mean differences were not significant, relationships between the variables showed interesting results. Significant correlational differences were found between the relationships of Perceived Competence and Teacher Control, Intrinsic Motivation, and Boredom. Teacher Control also had significantly different relationships with students' engagement between the two groups. The study adds to the understanding of Self-Determination Theory by providing additional context in which to examine how individuals may use their inner resources differently.

Keywords
motivation, gifted, teacher control, choice, boredom

Self-Determination Theory is classified as a humanistic approach to motivation because it examines the inner psychological aspects of the individual. Since its inception the theory has been refined and its robustness with the general population has been well documented. Only a few studies have been conducted to determine the applicability of this theory to those individuals whose cognitive abilities exist outside of the general population range (Lister & Roberts, 2011; Miserandino, 1996; Zisimopoulos & Galanki, 2009). This study seeks to add to the understanding of Self-Determination Theory by exploring its components' influence with students who have high cognitive ability.

Background

Self-Determination Theory (SDT) posits that humans have psychological needs that must be satisfied for intrinsic motivation to flourish (Ryan & Deci, 2002). The three main psychological needs that drive intrinsic motivation are: perceived competence, perceived autonomy and perceived relatedness. *Perceived competence* is the extent to which a person feels he/she possess the necessary skills and understanding to successfully perform the task at hand. It is a reflection of past experience as well as self-comparison with peers who may or may not be successful in the attempt to complete the task. *Perceived autonomy* refers to the locus of control in a given situation. Autonomously motivated students generally experience an internal locus of causality. They experience control over their actions and feel free to make decisions regarding their school-work (Reeve & Jang, 2006). *Perceived relatedness* is the degree to which individuals feel a part of a group or community. Students' perceptions regarding their relatedness may be influenced by the number of social interactions with other students and the classroom climate that is created by the teacher. Thus social context or the environment can influence the extent to which these needs are satisfied within the individual (Connell & Wellborn, 1991).

Several studies have demonstrated significant relationships between need satisfaction and outcomes in samples of children. Guay, Chanal, Ratelle, Marsh, Larose, and Boivin (2010) found that elementary students' intrinsic motivation varied across subject by individual interest. Patall, Dent, Oyer, and Wynn (2013) found that high school students' perceptions of choice in the classroom related to increased autonomy need satisfaction, which directly related to greater course value. Zisimopoulos and Galanki (2009) demonstrated that these relationships are not limited to children living in the United States. Their study found that the relationship between perceptions of competence and intrinsic motivation were significantly, positively correlated in Greek elementary students. Véronneau, Koestner, and Abela (2005) found that perceived competence was more strongly correlated to positive affect than perceptions of autonomy or relatedness for

elementary school children. Of these factors, only perceived competence showed strong significant unique contributions to regression analyses on the Children's Depressive Inventory and the Children's Multiple Affect Checklist. Thus, these findings point to interesting relationships between the factors and intrinsic motivation. They also raise questions regarding the stability of these relationships across grades and among individual students.

Perceived Competence

Perceived competence is described as the degree to which an individual feels successful in social interactions and in utilizing intellectual ability (Ryan & Deci, 2002). This component of Self-Determination Theory is facilitated when students are offered challenging curriculum and are able to add to existing knowledge and experience. When individuals encounter new situations and are able to successfully navigate through the experience, their perceived competence is enhanced. "The need for competence leads people to seek challenges that are optimal for their capacities and to persistently attempt to maintain and enhance those skills and capacities through activity."(Ryan & Deci, 2002, p.7). The need to enhance skills and capacities at increasing levels of challenge, presents problems for students who are already advanced beyond their same-age classmates and have no alternatives.

Perceived Autonomy

Autonomy is an intrapersonal experience meaning that it originates within the self. However, interpersonal interactions with teachers and environmental interaction with curriculum and learning materials can encourage and support autonomy in students (Reeve & Jang, 2006). The environment provides the context in which the needs of competence and autonomy are either supported or thwarted. Educational environments that support autonomy increase student learning, classroom engagement, and intrinsic motivation (Malmberg & Little, 2007; Reeve & Jang, 2006).

The current study conceptualized student perceptions of autonomy support as being comprised of two elements: choice and teacher controlling behavior (coercion). Katz and Assor (2007) noted "Students' sense of autonomy increases when teachers minimize coercion and interference, show understanding for students' perspective and feelings, provide a relevant rationale for the task, and offer choice" (p. 437). Therefore, this study sought to investigate the level of teacher coercion the students' perceived as well as the level of choice to measure autonomy support.

Choice as a component of perceived autonomy. As a component of perceived autonomy, choice has been positively linked to intrinsic motivation and engagement (Ryan & Deci, 2000). Patall, Cooper, and Wynn (2010) found that perception of choice was significantly positively related to intrinsic motivation for schoolwork and overall perceptions of autonomy support. Interestingly, when students felt that they had a choice in the homework, they reported feeling high levels of autonomy support. Ward, Wilkinson, Graser, and Prusak (2008) used an experimental design to show the impact of choice on physical education students. When the students were given a choice in activities, they became more self-determined. Conversely, when the choice option was removed, self-determination scores were significantly reduced.

Some researchers have found conflicting results regarding the role of choice in motivation. Reeve, Nix and Hamm (2003) found that choice was not an indicator of self-determination when compared with internal locus and volition. Assor, Kapalan and Roth (2002) found that when teachers exhibited different forms of autonomy-supportive practices, choice was not significant when compared to providing linkages to student goals and interests or allowing students to voice negative feelings regarding the task. Katz and Assor (2007) also found that when choice is considered within the self-determination theory context, it is motivating when the choices reflect students' interests. Other researchers have found that when student choices are driven by interest not only did the level of engagement increase but also students exhibited more advanced learning strategies (Renwick & McPherson, 2002). Thus, the role of choice in improving students' perceptions of autonomy may be more complex than previously imagined.

Teacher controlling behavior (coercion) as an inhibitor of autonomy. Reeve (2009) defined controlling behavior as beliefs and behaviors teachers display during instruction which provide limited ways for students to think, feel and behave. The following conditions were indicative of controlling behavior "a) adopt only the teacher's perspective; b) intrude into students' thoughts, feelings, or actions; and c) pressure students to think, feel, or behave in particular ways" (Reeve, 2009, p. 160). Controlling teachers rely on intrusion and pressure to mold student behavior and opinions. Thus students of varying cognitive abilities and affective characteristics may perceive the effects of teacher coercion differently.

Several studies have linked teacher behavior to student engagement (den Brok, Levy, Brelmans, & Wubbels, 2005; Fredricks, Blumenfeld, Friedel, & Paris, 2004; Reeve, Jang, Carrell, Jeon & Barch, 2004; Skinner, Kindermann, & Furrer, 2009; Skinner, Wellborne, & Connel, 1990; Tsai, Kunter, Ludtke, Trautwein, & Ryan, 2008). These studies have found that teacher behavior, as either autonomy

supportive or controlling, influenced student engagement both behaviorally and emotionally. Fredricks, Blumenfeld, Friedel and Paris (2004) found that student engagement was strongly correlated with perceptions of teacher support. Students reported less interest in lessons where teachers were perceived as controlling (Tsai, et al., 2008). Teachers in this study who disrupted students' natural learning rhythms and did not allow time for reflection were considered controlling by students resulting in classes that were rated as less interesting. This finding shows that interest varies by students and by lesson but nonetheless, teacher-controlling behavior significantly, negatively influences students' interest in subjects.

Relationships Between Competency and Autonomy

Researchers have found that perceived competence and autonomy have stronger relationships to motivation than relatedness. These two components have also been significantly correlated to one another (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). According to Cognitive Evaluation Theory (Deci & Ryan, 1985), a sub-theory of Self-Determination Theory, the interaction between people and the environment can serve to enhance or inhibit feelings of competence and autonomy. Cognitive Evaluation Theory also posits that perceived competence is influenced by the situational support or reduction of feelings of autonomy. Students' sense of competence is complimented by the amount of choice or control offered in the instructional setting. Increased flexibility in the curriculum and autonomy-supportive behavior by the teacher sends a positive message to students in terms of expected success in the task. This perceived autonomy support is required in addition to perceived competency for intrinsic motivation to be reported (Ryan & Deci, 2000). The environment provides cues to the individual regarding the level of autonomy support that is available for individuals (Connell & Wellborn, 1991). Providing opportunities for choice and acknowledging the individuals' perspectives are means by which autonomy support may foster perceived autonomy and perceived competence. Given the strong relationship between perceived competence and autonomy, it is important to understand how differences in these perceptions may affect one another and intrinsic motivation.

Perceptions of choice and challenge may differ for students with varying levels of cognitive ability. Katz and Assor (2007) stated, "It appears that choices that offer options of intermediate difficulty are competence-supporting and therefore motivating. In contrast, choice options that are too easy or too difficult undermine motivation." (p. 435). Thus students with different levels of cognitive ability may be expected to perceive the same task as easier or harder depending on their abilities. Miserandino (1996) found significant differences in autonomy between gifted and non-gifted learners. Students who were not getting their competency and autonomy needs met in school tended to disengage in the

educational process. In a qualitative study using Self-Determination Theory as the framework with which to investigate motivation of high ability students, Garn and Jolly (2014) found that high ability students value choice (autonomy) as a strong motivational factor that contributes to the fun aspect of learning. High ability students indicated that learning experiences that related to their personal interests and goals increased their motivation. Specifically, these students indicated that teachers who incorporated an understanding of the students were the most successful at motivating them. Garn and Jolly also found that choice facilitated intrinsic motivation in gifted learners by allowing them to take ownership in the learning. Although these findings support the ideas that autonomy supported high motivation, the authors suggest that further research is needed to determine how teachers support or hinder autonomy, competence, and relatedness and how these relationships affect the academic intrinsic motivation of high ability students.

Gifted Students

Gifted students are those who possess advanced cognitive abilities compared to their age-mates. The Federal definition was refined in the U.S. National Excellence Report (1993). The federal government has defined giftedness as:

> Students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services and activities not ordinarily provided by the school in order to fully develop those capabilities. (US Elementary and Secondary Education Act, P.L. 103-382, Title XIV, p. 388).

States and districts are not required to use this definition; however, most school districts create their own criteria for identifying gifted students based on this conceptualization of giftedness.

Identification procedures vary by school district. Despite this, literature reports that 90% of school districts use scores on standardized achievement or aptitude tests to identify gifted students (Sarouphim, 2002). While researchers may use IQ score criterion to statistically determine gifted individuals, the costs both in time and money, are prohibitive for most schools to use them to identify gifted students. Most theorists now propose the use of standardized achievement tests and local norms to reflect the developmental constraints and opportunities that may differ for students who are members of minority groups or from lower socioeconomic status households in addition to other measures and teacher recommendations for identification (Lohman, 2005). The National Association for

Gifted Children reflects the trend towards using standardized test scores as measures in their definition of gifted students: "Gifted individuals are those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains." (NAGC, 2010, p.1). Thus, students who score in the 90th percentile may be recommended for further consideration for gifted identification in many school districts.

Given their advanced cognitive ability, gifted students tend to report high perceptions of competence. However, not all gifted students display behaviors and achievement that reflect high levels of motivation. The underachievement of gifted students, where a difference is noted between ability and achievement or classroom performance, has perplexed researchers for the past thirty years. The National Excellence Report estimated the percentage of gifted students who were underachieving to be between 20 – 40% (US Government, 1993). Numerous research studies have been conducted to help understand what factors are impeding students' performance (Feldhusen, 1991; Reis & McCoach, 2000; Whitmore, 1986). A commonality that has emerged from this research is the recognition that gifted students have unique social, emotional, and cognitive needs which may not be met in a traditional classroom.

Study Purpose and Importance

Some research has been conducted comparing gifted and non-gifted students on various components of motivation. Zisimopoulos and Galanki (2009) found that differences in cognitive ability in Greek elementary students with and without learning disabilities resulted in differences in perceived competence and intrinsic motivation. In this study, the students without learning disabilities had statistically significantly higher means for academic competence and correlations between their perceived competence and academic intrinsic motivation. In a meta-analysis of 40 studies, Lister and Roberts (2011) found that significant differences existed between gifted and non-gifted students for the effect size of perceived academic competence. In addition, grade level significantly moderated the effects as both groups improved their ability to judge their academic competence in comparison with classmates thus the difference in perceived competence became greater as the participants moved from elementary to high school.

Gottfried, Gottfried, Cook, and Morris (2005) found that academic intrinsic motivation added a unique and independent contribution beyond IQ alone to predicting student achievement. However, their findings indicated significant differences in IQ for those who were categorized as highly motived (gifted motivation) and average motivation with the higher motivated group having a much

higher IQ effect size. In this study, the students in the highly motivated group also had significantly higher self-concepts for general school performance. Their findings also supported the idea that while gifted motivated students may be gifted intellectual students, the two constructs do not guarantee a significant overlap between the groups. The idea that intellectual giftedness as separate from motivational giftedness was supported by McCoach and Siegle (2003) who identified motivation as a key component in explaining differences in performance between gifted students who achieve and those who underachieve.

Purpose

The purpose of this study is to investigate perceptions of competence and autonomy in gifted and non-gifted students to understand how Self-Determination Theory functions in various levels of cognitive ability. Self-Determination Theory states that perceptions of competence, autonomy and relatedness are key components of intrinsic motivation. This study examines the relationship between perceived competence and autonomy as measured by perceptions of choice and teacher coercion to gain insight into the relationships between these components and the outcome measures of intrinsic motivation, boredom, and behavioral engagement. A working hypothesis of this study is that gifted students will have higher scores on perceived competence. This high level of competence will influence perceptions of teacher control, boredom, and intrinsic motivation.

Given the research showing the strong relationship between perceived autonomy and competence, the decision was made to focus on these two areas. Research using participants with different cognitive abilities will add to current theoretical and practical understandings regarding the components of intrinsic motivation. For example, a better understanding of how cognitive ability affects perceptions of competence and autonomy could be obtained allowing teachers and researchers to modify their practice to improve all students' intrinsic motivation.

Methods

This study used a group-administered survey research design. Students who scored above the 90th percentile composite score on the Iowa Test of Basic Skills were classified as gifted for this study. The Iowa Test of Basic Skills is a standardized achievement test that is used in schools from K-8. It is comprised of subtests that measure students' understanding of: vocabulary, word analysis, reading comprehension, language, mathematics, social studies and science. The tests are designed to be used with teacher observations to plan individual instruction. In this school district, scoring above the 90th percentile on the Iowa Test of Basic Skills is one of the identifying criteria for consideration for students being

placed in the talented and gifted program. This study compared those scoring in the 90th percentile and above to those who scored below the 90th percentile to identify differences in perceived autonomy support and competence. The comparative analysis was performed using independent means comparisons, correlations, and ANOVA analysis.

Participants

Participants were 105 students (47 male and 58 female) from a small suburban city in the Midwest. A letter of consent was sent to the parents of all of the fourth through eighth grade students in the district. Seventy-four percent of the fourth through sixth grade students and 55% of the seventh and eighth grade students returned consent documents. The sample consisted of students from grade 4 - 8. Table 1 lists the student demographic data by grade. All of the students in the study were Caucasian reflecting the school population of 100% White students. Of the 105 students, 28 met the criteria for being identified as gifted for this study.

Instruments

Students were given a paper and pencil survey and asked to indicate their agreement with statements regarding perceptions of competence, teacher control, choice, engagement, boredom and intrinsic motivation. Subscale measures from six different instruments were used to create the questionnaire that was used in this study. Reliabilities for the subscales in this study are shown in Table 2.

Perceived competence. The measure of perceived competence was the Perceived Competency Scale (Williams & Deci, 1996). This scale utilized four questions to assess the level of competence an individual felt toward the ability to master the material in a course. This short questionnaire was reported to have an alpha coefficient of .80 in one study (Williams & Deci, 1996). It is considered a valid instrument for measuring specific attitudes toward an academic class (Williams & Deci, 1996). Students were asked to indicate their level of agreement with the following statements: "*1) I feel confident in my ability to learn this material," "2) I am capable of learning the material in this course" "3) I am able to achieve my goals in this course" "4) I feel able to meet the challenge of performing well in this course."*

Teacher control. The items that were used for assessing perceptions of teacher coercive behavior were taken from the Scales Measuring Autonomy-Affecting Teacher Behaviours (Assor, et al., 2002). This scale was comprised of twelve questions that assessed the degree to which individuals felt teachers were stopping them from doing interesting academic activities or requiring them to participate in worksheets, readings, and other classroom activities that did not

interest the students. An example of some of the questions that were used is: "*When I am doing something that interests me, my teacher give me enough time to finish it." "My teacher tells me what to do all the time." "My teacher interrupts me in the middle of activities that interest me.*"

Perceived choice. *The Rochester School Assessment Package* was used to measure perceptions regarding autonomy-supportive context of the classroom through the provision of choice (Wellborn & Connell, 1998). *The Rochester School Assessment Package* is a common measure of behavioral and emotional engagement. This package consists of surveys for students, teachers and parents. The student survey asks items about effort, attention and class participation. The student survey had an alpha coefficient of .79-.86 in Wellborn and Connell's (1998) study, which is considered an adequate range for reliability. This study used the subscales of choice consisting of 11 questions. Some of the statement used are "*My teacher allows me to choose ho how to do my work in the classroom." "My teacher asks us which topic we would like to study more and which we prefer to study less." "When my teacher gives us an assignment, we are allowed to choose which questions to answer.*"

Intrinsic motivation. Intrinsic motivation was measured using seven questions from the Academic Self-Regulation Questionnaire (SRQ-A). The questions ask students to rate why they do homework, why they do schoolwork, and why they try to answer hard questions in class. These components assess the intrinsic motivation of students toward schoolwork and homework. The scale had an alpha of .85 in Ryan & Connell's (1989) study. The statements used were "*I do homework because it is fun." "I do homework because I enjoy doing it." "I work on my classwork because it's fun." "I work on my classwork because I enjoy doing my classwork." "I try to answer hard questions in class because I enjoy answering hard questions." "I try to answer hard questions in class because it's fun." "I try to do well in school because I enjoy doing my school work well.*"

Engagement. This study used scales developed by Fredricks, Blumenfeld, Friedel and Paris (2003) to measure emotional and behavioral engagement. Fredericks et al. (2003) demonstrated Cronbach's alpha reliability of these scales to be .67 - .73. Some examples of the questions used for emotional engagement were "*I feel happy in school." "I feel excited by my work at school." "I like being in school.*" The following are the questions that were used to assess behavioral engagement. "*When I am in class, I just act as if I am working." "I complete my homework on time." "I follow the rules at school." "I pay attention in class." "I get in trouble at school."*

Boredom measurement. The outcome measure of boredom was assessed by using 12 items from the Boredom, Confusion, Adaptation Scale - boredom subscale (Frick, 1985). These items ask students to indicate if statements were like them or not. An example of some statements is: "*My teachers say the same things over and over", "I feel tired in school", "My school work isn't very challenging*". This subscale had a Kuder Richardson 20 reliability measure of .71 (Frick, 1985). Strong inverse relationships were reported between boredom and measures on standardized tests and teacher grades (Frick, 1985).

Results

Descriptive Statistics

Descriptive statistics are shown for the variables split by groups in Table 2. Significant differences were found for Perceived Competence and Intrinsic Motivation. Engagement and Boredom were significant at $p < .10$. Given the small number of gifted students it is not unreasonable to suspect that the significant differences would be greater with a larger sample size.

Tests for Relationships Among Variables

Z scores were calculated to compare the relationships among the variables between non-gifted and gifted students and are shown in Table 3. Significant relationship differences were found between competence and boredom (gifted $r = .171$, non-gifted $r = -.368$, $p < .001$). Significant relationship differences were noted between boredom and competence and boredom and intrinsic motivation (gifted $r = -.017$, non-gifted $r = -.423$, $p < .001$). Other significant relationships were found for engagement and teacher control (gifted $r = -.187$, non-gifted $r = -.444$, $p < .05$). Relationships with intrinsic motivation were slightly less significant with $p < .10$. Thus although there were not many differences noted between the groups on the individual variables there are clearly significant differences in the ways in which the variables interact with one another for non-gifted and gifted students.

Tests for Group Differences

A one-way analysis of variance (ANOVA) with group as the independent variable and perceived competence, teacher control, perception of choice, intrinsic motivation, engagement, and boredom revealed significant group differences. Tests of between-subjects effects revealed significant differences in all variables except those measuring autonomy (perceived teacher control, perceived choice). The most significant differences were in Perceptions of Competence $F(1,97) = 9.440$, $p = .003$, Engagement $F(1,95) = 4.325$, $p = .040$, and Intrinsic Motivation $F(1, 96) = 4.260$, $p = .042$. Boredom was significant at the $p < .10$ level $F(1, 94) = 2.943$, $p = .090$. The two measures of autonomy were not significant Teacher Control $F(1, 89) = .451$, $p = .503$ and Perception of Choice $F(1,94) = .343$, $p = .559$. Results of the

ANOVA are shown in Table 4. In summary, the only variables that showed similarity between the two groups were those that measured perceptions of autonomy. The means for both groups on the measures of Teacher Control were (non-gifted M = 32.75, gifted M = 34.22) with a possible range of 13-56 suggesting that both groups felt slightly controlled by their teachers.

Discussion

The purpose of this study was to examine how the factors of Perceived Competence, Teacher Control, and Choice operated for students of varying levels of cognitive ability. It adds to the understanding of Self-Determination Theory by providing a glimpse into how the factors of perceived competence and autonomy influence the motivation and engagement of gifted and non-gifted students. The results showed differences in the means of perceived competence and intrinsic motivation between the groups with gifted students having higher means for each variable. The comparison of correlations between gifted and non-gifted students showed that differences existed among the relationships of the variables.

Perceived Competence was the only variable that showed significant differences in mean scores at $p < .001$. This difference was also found to be significant in the relationships between Perceived Competence and the outcome measures of Boredom, Intrinsic Motivation, and Control. The largest difference was noted in the relationship between Perceived Competence and Boredom. The correlation for gifted students ($r = .171$) indicates a weak positive relationship. As perceptions of competence increase there is a slight increase in boredom. Non-gifted students' correlation ($r = -.368$) suggests a moderate negative relationship. Thus increases in students' perception of competence decrease their reports of boredom. This result is not surprising and supports research that has consistently shown gifted students expressing feeling bored in class (McCoach & Siegle, 2003). This finding could point to the idea that gifted students accept being bored as a part of daily school life. Numerous researchers have indicated that it is not unusual for gifted students to be significantly ahead of their peers and spend a great deal of the school day waiting for them to catch up. Perhaps by third grade the gifted students have accepted this waiting as normal. Another possible explanation for the small positive correlation for gifted students could be that these students are more interested in learning in general and thus find ways to reduce boredom by introducing their own complexity to learning. They may also have developed personal ways to battle boredom such as daydreaming and thus do not report a strong level of boredom with school. The moderate negative correlation of non-gifted students may be explained by examining the claim of boredom as a synonym for confusion or a lack of understanding. Frick (1985) found that students would

cite boredom when material was beyond their capability. Thus as competence increases and students are able to better connect with material their reports of boredom may decrease.

Significant differences were found for Perceived Competence and Intrinsic Motivation. Intrinsic Motivation means scores were significant at $p < .05$ with gifted students reporting higher levels of motivation. Both groups had significant positive relationships between Competence and Intrinsic Motivation (gifted $r = .712$, non-gifted $r = .514$) thus the magnitude and direction of these correlations suggests that Perceptions of Competence directly affect Intrinsic Motivation; however, gifted students' higher perceptions of competence resulted in a stronger positive report of intrinsic motivation than non-gifted students. Some researchers have found that gifted students may be naturally more curious and intrinsically motivated than their classmates (Gottfried, et al., 2005; McCoach & Siegle, 2003; Tzuriel et al., 2011). Thus stronger levels of perceived competence and stronger levels of intrinsic motivation may combine to show a much stronger relationship in these students.

Significant differences were found between the groups in the relationships of Teacher Control, Engagement, and Intrinsic Motivation. Gifted students' correlation between perceptions of teacher control and engagement ($r = -.241$) reflects a low, negative relationship such that increases in teacher control result in a slight decrease in student engagement. Non-gifted students' correlation ($r = -.541$) shows a much stronger negative relationship where controlling teacher behaviors decrease student engagement. Research has shown that often-times gifted students prefer interacting with adults rather than age-mates. A possible explanation for this result is that gifted students are more engaged because they are discussing academic ideas with someone closer to their level. Even when teachers may be interrupting students' thoughts or trying to force their ideas on the students, the opportunity to debate or strengthen ideas may be engaging for gifted students.

Although only significant at the $p < .10$ level, differences were noted in the relationship between teacher controlling behavior and intrinsic motivation between the two groups. The relationship for gifted students ($r = -.116$) indicates a small, negative influence on intrinsic motivation. The relationship for non-gifted students ($r = -.408$) shows that controlling teacher behavior has a moderate negative result on intrinsic motivation that follows expectations in Self-Determination Theory. This finding is interesting in light that there were no significant differences in the group means for teacher controlling behavior as it points to the relationship between the students' perceptions of teacher behavior and their response to the perceptions.

Choice also had a significant difference ($p < .10$) between the groups for Intrinsic Motivation Gifted students ($r = .302$) reflecting a small positive relationship between the amount of choice that was given by the teachers and its influence on students' intrinsic motivation. Non-gifted students ($r = .558$) showing a stronger relationship between the level of perceived choice and motivation. As no significant differences were noted between the groups for perceptions of choice, it is interesting that such a difference in the relationships exist. It appears that non-gifted students respond more strongly to perceptions of choice. However, it may also be the case that gifted students already possess high levels of intrinsic motivation and perceptions of choice could only slightly influence an already high score.

The findings in this study regarding autonomy and its lack of influence on engagement or intrinsic motivation for gifted students stand in stark contrast to typical findings of SDT researchers (Niemaic & Ryan, 2009; Reeve and Jang, 2006; Garn & Jolly, 2014). Typically researchers found that autonomy supportive teachers significantly influenced student motivation. This finding suggests that the relationship between the gifted students' perceptions of competence may be so strong that they supersede any affect that perceptions of autonomy may have on intrinsic motivation. It supports the findings of Zisimopoulos and Galanaki (2009) who noted that cognitive ability did seem to mediate the effects of the three variables. The study's findings also support those of Véronneau et al. (2005) who found that perceptions of competence were more strongly related to elementary students' well being than those of autonomy and relatedness. This finding is important for Self-Determination Theory because it highlights that some variables may be more influential than others on intrinsic motivation.

A possible explanation for the current finding could be that the teachers in this study were minimally controlling and provided enough choice to prevent hindering students' intrinsic motivation. However, an examination of the data distribution showed that the scores were normally distributed for both groups. A second possible explanation may be the grade levels investigated in this study. Intrinsic motivation has been shown to decrease as students move through school grades and their perceptions of competence and autonomy become clearer (Lister and Roberts, 2011). Thus the gifted participants may be too young to differentiate their perceptions and may still feel excited and curious about learning. However, it should be noted that due to the small sample size of gifted students significant results might exist but fail to be detected.

This study highlights an important aspect to the understanding of the Self-Determination Theory of motivation. Cognitive differences may influence the

model fit. Much of the research of SDT has been done with participants of average cognitive ability. These findings show that students with high cognitive ability may be influenced more by Perceived Competence than average ability students even when both groups had similar perceptions of autonomy support.

Further research may benefit from replicating this study with a larger group of participants to increase the number of gifted participants and examine possible age (grade) effects for differences in student motivation. Some studies of SDT have found that student intrinsic motivation becomes more differentiated by subject as students' age (Deci & Ryan, 1985; Eccles, 1993; Wigfield, 1997). Guay et al. (2010) found that years in school did not affect the relationship between the motivation subscales; however, they did find that intrinsic motivation between content areas changed as students increased in grade level.

Limitations

There are several limitations to this study. The first is the small sample size. Using a sample size of only 105 total participants and 28 participants who qualified as gifted for this study reduces the chances of finding statistically significant differences. It also limits the generalizability of the findings of the study. Generalizability is further limited by the fact that all of the participants were Caucasian and from a small suburban town in the Mid-west. Students from large metropolitan areas or racially diverse students may have other factors that influence their school experiences. Some of the non-significant results for the group of gifted students may have been significant if the number in the group had been larger.

The second limitation of this study involves the construction of the comparison groups. Choosing a cutoff of the 90^{th} percentile and comparing the means of two groups may have minimized differences that could have been found if the groups were further subdivided into the 20^{th} percentile, 40^{th} percentile and 60^{th} percentile or some similar group construction. Further, the 90^{th} percentile may be too generous of a criterion for distinguishing among high cognitive ability students, differences between students may have been more significant if a higher cutoff was used such as the 95^{th} percentile. A third limitation is using self-report measures as a means of analysis. While attempts were made to assure students of the confidentiality of their responses and students were encouraged to answer truthfully, there is no way to insure that students did not respond in socially desirable ways.

References

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviors predicting students' engagement in schoolwork. *British Journal of Educational Studies, 72*, 261-278.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *Self-processes and development.* (pp. 43-77) Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134.

den Brok, P., Levy, J., Brekelmans, M., & Wubbels, T. (2005). The effect of teacher interpersonal behaviour on students' subject-specific motivation. *Journal of Classroom Interaction, 40*(2), 20-33.

Feldhusen, J. F. (1991). Boredom or challenge for the academically talented in school. *Gifted Education International, 7*, 80-81.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2003). School Engagement: Potential of the Concept, State of the Evidence. *Review of Educational Research, 74*(1), 59-109.

Frick, S. (1985). Diagnosing boredom, confusion, and adaptation in school children. *Journal of School Health, 55*(7), 254-257.

Garn, A.C. & Jolly, J.L. (2014). High ability students' voice on learning motivation. Journal of Advanced Academics, 25(1), 7-24.

Guay, F., Chanal, J., Ratelle, C.F., Marsh, H.W., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary children. *British Journal of Educational Psychology, 80,* 711-735.

Gottfried, A. W., Gottfried, A. E., Cook, C. R., & Morris, P. E. (2005). Educational Characteristics of Adolescents With Gifted Academic Intrinsic Motivation: A

Longitudinal Investigation From School Entry Through Early Adulthood. *Gifted Child Quarterly, 49*(2), 172-186.

Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review, 19*(4), 429-442.

Lister, K. & Roberts, J. (2011). The self-concepts and perceived competencies of gifted and non-gifted students: a meta-analysis. *Journal of Research in Special Education Needs, 11*(2), 130-140.

Lohman, D. F. (2005). An aptitude perspective on talent: Implications for identification of academically gifted minority students. *Journal for the Education of the Gifted, 28*(3-4), 333-360.

Malmberg, L., & Little, T. (2007). Profiles of ability, effort, and difficulty: Relationships with worldviews, motivation and adjustment. *Learning and Instruction, 17*, 739-754.

McCoach, B., & Siegle, D., (2003). Factors that differentiate underachieving gifted students from high-achieving gifted students. Gifted Child Quarterly, 47(2), 145-154.

Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology, 88*(2), 203-214.

National Association for Gifted Children. (2010). *Redefining giftedness for a new century: Shifting the paradigm.* Retrieved from www.nagc.org/index.aspx?id=574

Patall, E. A., Cooper, H., & Wynn, S. R. (2010). The effectiveness and relative importance of choice in the classroom. *Journal of Educational Psychology, 102*(4), 896-915.

Patall, E.A., Dent, A.L., Oyer, M., & Wynn, S.R. (2013). Student autonomy and course value: The unique and cumulative roles of various teacher practices. *Motivation and Emotion, 37*, 14-32.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175.

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209-218. doi:10.1037/0022-0663.98.1.209

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support[1]. *Motivation and Emotion, 28*(2), 147-169.

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology, 95*(2), 375-392.

Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly, 44*(3), 152-170.

Renwick, J. M., & McPherson, G. E. (2002). Interest and choice: Student-selected repertoire and its effect on practising behaviour. *British Journal of Music Education, 19*(2), 173-188.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57*(5), 749-761.

Ryan, R. & Deci, E. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54 - 67.

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research.* (pp. 3-33) Rochester, NY, US: University of Rochester Press.

Sarouphim, K. M. (2002). DISCOVER in high school. *Journal of Secondary Gifted Education, 14*(1), 30-38.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493-525.

Skinner, E. A., Wellborn, J. G., & Connel, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology, 82*(1), 22-32.

Tsai, Y., Kunter, M., Lüdtke, O., Trautwein, U., & Ryan, R. M. (2008). What makes lessons interesting? The role of situational and individual factors in three school subjects. *Journal of Educational Psychology, 100*(2), 460-472. doi:10.1037/0022-0663.100.2.460

U.S. Department of Education. (1993). *National excellence: A case for developing America's talent*. Washington, DC: Office of Educational Research and Improvement, U.S. Government Printing Office.

Vansteenkiste, M., Lens, W., & Deci, E. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: another look at the quality of academic motivation. *Educational Psychologist, 41*(1), 19-31.

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K., & Deci, E. (2004). Motivation, learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology, 87*(2), 246-260.

Véronneau, M., Koestner, R.F, & Abela, J.R.Z. (2005). Intrinsic need satisfaction and well-being in children and adolescents: an application of the self-determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292.

Ward, J., Wilkinson, C., Graser, S. V., & Prusak, K. A. (2008). Effects of choice on student motivation and physical activity behavior in physical education. *Journal of Teaching in Physical Education, 27*(3), 385-398.

Wellborn, J. G., & Connell, J. P. (1998). *Manual for the Rochester Assessment Package for Schools.* Unpublished manuscript.

Whitmore, J. (1986). Understanding a Lack of Motivation to Excel. *Gifted Child Quarterly, 30*(2), 66-69.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70*(4), 767-779.

Zisimopoulos, D.A., Galanaki, E.P. (2009). Academic intrinsic motivation and perceived academic competence in Greek elementary students with and without learning disabilities. *Learning Disabilities Research & Practice, 24*(1), 33-43.

Appendix

Table 1

Student Demographic Data (N = 105)

Grade	# of Males	# of Females	Total Gifted	Non-Gifted
4	13	13	8	18
5	10	13	4	19
6	10	9	7	12
7	9	13	6	16
8	5	10	3	12
Total	47	58	28	77

Table 2

Group Differences for Variables

		Non-Gifted N=77		Gifted N=28		T Test
Variable	A	Mean	SD	Mean	SD	t
1. Competence	.699	15.80	2.92	17.82	2.21	**-3.32****
2. Teacher Control	.874	32.53	8.20	40.36	5.96	-.63
3. Choice	.683	9.63	3.34	10.11	3.02	-.66
4. Intrinsic Motivation	.913	17.63	6.32	20.39	6.62	**-1.95***
5. Engagement	.823	37.53	8.20	40.36	5.96	**-1.67**$^{+}$
6. Boredom	.775	37.12	8.26	40.25	7.95	**-1.73**$^{+}$

$^{**}p < .001$, $^{*}p < .05$, $^{+}p < .10$

Table 3

Z Score Results Between Correlations for Non-gifted and Gifted Students

Variable	1	2	3	4	5	6
1. Competence	-					
2. Teacher Control	**-1.367**$^{+}$	-				
3. Choice	.662	.187	-			
4. Intrinsic Motivation	**-1.397**$^{+}$	**-1.369***	**1.376***	-		
5. Engagement	-.086	**-1.55****	1.129	.961	-	
6. Boredom	**-2.413*****	.954	.299	**-.2.254*****	**-1.509**$^{+}$	-

$^{***}p < .001$, $^{**}p < .05$, $^{+}p < .10$

Table 4

ANOVA Analysis of Mean Differences Between Group Variables

Variable		Sum of Squares	df	Mean Square	F
Competence	Between Groups	73.186	1	73.186	**9.440***
	Within Groups	751.986	97	7.752	
	Total	825.172	98		
Teacher Control	Between Groups	41.158	1	41.158	.451
	Within Groups	8116.667	89	91.199	
	Total	8157.824	90		
Choice	Between Groups	3.681	1	3.681	.343
	Within Groups	1008.319	94	10.727	
	Total	1012.000	95		
Intrinsic Motivation	Between Groups	180.858	1	180.858	**4.260***
	Within Groups	4075.264	96	42.451	
	Total	4256.122	97		
Engagement	Between Groups	258.267	1	258.267	**4.325****
	Within Groups	5673.485	95	59.721	
	Total	5931.753	96		
Boredom	Between Groups	194.503	1	194.503	**2.943**+
	Within Groups	6211.456	94	66.079	
	Total	6405.958	95		

*$p < .05$, +$p < .10$